

## Accelerator Systems Division Highlights for the Week Ending April 11, 2003

### ASD/LANL: Warm Linac

#### HIGH-POWER RF (WBS 1.4.1.1)

Accomplishments This Week: (1) The first SC linac transmitter system was delivered to ORNL on 4/10; also, factory acceptance test of the second was successfully completed. (2) We conditioned RFQ/DTL klystron S/N 9 to full power and completed 11 hours of the 96-hour heat run at full 2.5-MW output RF power, 1.2-ms pulsewidth, and 60-Hz repetition rate. (3) We successfully conditioned two DTL windows, S/N 3 and S/N 5, to full power, 2.5 MW, and completed the four-hour average power test. (4) SC linac klystron S/N 16 is undergoing factory tests at CPI; we completed successful site acceptance tests on klystrons S/N 14 and 15, while S/N 1, 9, and 11 were shipped to ORNL. (4) The first Thales SC linac klystron, S/N 2, arrived at LANL.

Concerns & Actions: (1) The 5 MW CCL RF system continues to be our biggest concern. Testing remains suspended pending repairs of broken circulator, loads, and sliding short. Thales informed us that they have delayed the testing of the first 5 MW klystron until June. The klystron is our critical path item, with forecast of the first unit delivery to ORNL now at Sept. 15. This would present a 15-week delay relative to the current early finish IPS milestone CCLFB90 ("install first CCL RF System at ORNL"). We informed Thales that by 4/15, we expect a detailed description of their approach and a schedule with firm delivery dates. We also notified ORNL ASD and Project office of the IPS impact. Forecast delivery of the last CCL RF system continues to support early start of CCL commissioning (IPS milestone CCL240) on 5/17/04, because 3 Thales tubes are built and ready for acceptance tests, pending resolution of the output transition arcing problem. (2) Meanwhile, 5 MW klystron S/N 2 was re-installed in the LANL test stand to accommodate the visit next week from the circulator vendor (AFT); they will implement improvements to the circulator kapton window, where we are experiencing arcing at 5 MW. (3) We will begin high-power testing the new o-ring on the 5-MW loads next week. (4) The sliding short that failed at 5 MW is currently being repaired at LANL. (5) RFQ/DTL klystron S/N 7, the 5th tube we passed through the site acceptance tests, was found to have a shorted magnet winding. We discovered that the short occurred after the factory acceptance test because the E2V factory doesn't test with all shielding in place. (They test in a lead house with open shielding to allow for tuning.) When E2V assembled the shielding prior to shipment they shorted out a magnet turn. We fed this information back to the E2V and they changed their post assembly inspection procedure. As a result of this change, E2V found a shorted coil on S/N 8, which was boxed up, and ready to ship. They held this tube and are now retesting.

#### HIGH-VOLTAGE POWER CONDITIONING (WBS 1.4.1.2)

Accomplishments: (1) Prototype HV converter-modulator (HVCN) operation supported klystron testing at Los Alamos. Unit ran without failure. (2) Production HVCN S/N 3 for DTL Tank 3 finished testing into beam stick at ORNL at parameters 130 kV & 30 Hz. (3) The rebuilt RFQ transformers were received at ORNL and tested. (4) Modeling is being performed to examine ORNL changes to utility grid distribution system, IGBT freewheeling diode oscillations, the 3 klystron RFQ/DTL-1/DTL-2 configuration, and resonant rectification networks.

Concerns & Actions: The Q/A team (LANL & ORNL) was at Dynapower to review procedures and corrective measures in HVCN production. Rej and Bretzke have scheduled a follow-up teleconference with the Company President on 4/14. LANL also contracted HVCN expert, William North, to travel to Dynapower for fabrication oversight.

#### DRIFT-TUBE LINAC (WBS 1.4.2)

Accomplishments: (1) All Tank-3 parts are now at ORNL. (2) Jim Billen was at ORNL to lead the Tank-3 tuning (accelerating fields and drive iris). Work was completed on 4/10, 1.5-days ahead of schedule. (3) The drive iris for T-1 is complete and was shipped to ORNL. (4) Seven salvaged T-1 drift tubes (empties) were delivered to ORNL. (5) All rebuilt T-1 drift tubes have had both faces profiled and all have passed leak checking; one needs to be plated and another checked regarding possible surface porosity (non-weld). Nineteen units have had stems welded on and all welds have been successfully leak checked. Units will be split between plating and stem straightening to speed production. We project shipping the first batch on 4/15. (6) Forty T-1 top hats are complete; balance is being plated. (7) New welding fixture for T-1 post couplers was fabricated and will be tested next week at ESCO. (8) T-4 and 5 drive irises are undergoing interior cavity machining. (9) 28 additional T-4 diverters are ready for diverter to sleeve braze. (10) With weld qualifications completed (Fig. 1), water channel welding of T-4 drift tubes are underway at Hanford. (11) T-4 stand is being machined; projected ship date to ORNL is 4/18.



Fig. 1: E-beam welding qualification of DTL Tank-4, 5, and 6 water channel welds for tanks at Hanford.

#### COUPLED-CAVITY LINAC (WBS 1.4.4)

**Accomplishment:** (1) LANL and ASD staff were at ACCEL this week. Seven CCL Module-1 segments are completed. Tuning of Segment-1 is completed. We revised the tuning procedures, and ACCEL and LANL are comfortable with execution. The ASD alignment group was essential in the mechanical measurements, which revealed outstanding machining tolerances (better than 10x spec in some cases).

**Concerns & Actions:** While at ACCEL, we uncovered an incorrect dimension in one of the side tuning holes, on some of the segments in Modules 2 and 3. The error was corrected, so it would not show up in Module 4 production. Meanwhile we see a straightforward path to modifying modules 2 and 3 segments. We do not envision negative impact on the integrated project schedule, but more careful evaluation is needed.

#### ASD/JLAB: Cold Linac

Testing of cryomodule M-1 remains on hold. Investigation of the tuner problem has focused attention on the motor. Resolution of the problem is expected next week, using motors pre-qualified in the VTA for 4 K operation. As the supply of qualified motors expands, assembly of cryomodule M-2 can resume. Assembly of M-3 continues.

The M-4 string is assembled and under vacuum (see photo). One cavity has been qualified for the M-5 string. The last 10 medium- $\beta$  cavities have been received from the vendor.



Cavity HB-01 has been prepared for VTA testing next week.

The purifier was shipped to and received at SNS.

### **ASD/BNL: Ring**

Bill Foyt, consultant for ORNL, performing a periodic audit, visited BNL. Bill worked with Dave Dale (Procurement) and John Hauser, Kerry Mirabella and Bob Van Wormer from Project Controls.

After passing acceptance, the first article 36CDM30 corrector magnet was installed on the magnetic measurement stand and measurements of the skew quadrupole configuration have been completed and are being analyzed.

HEBT Collimators: scheduled to ship May 23<sup>rd</sup> from SDMS in France to ORNL. The base plates and Jack stands being manufactured at BNL will arrive in ORNL in June.

Ring half-cells: # 5 has shipped, and work continues on half-cells #6 and 7.

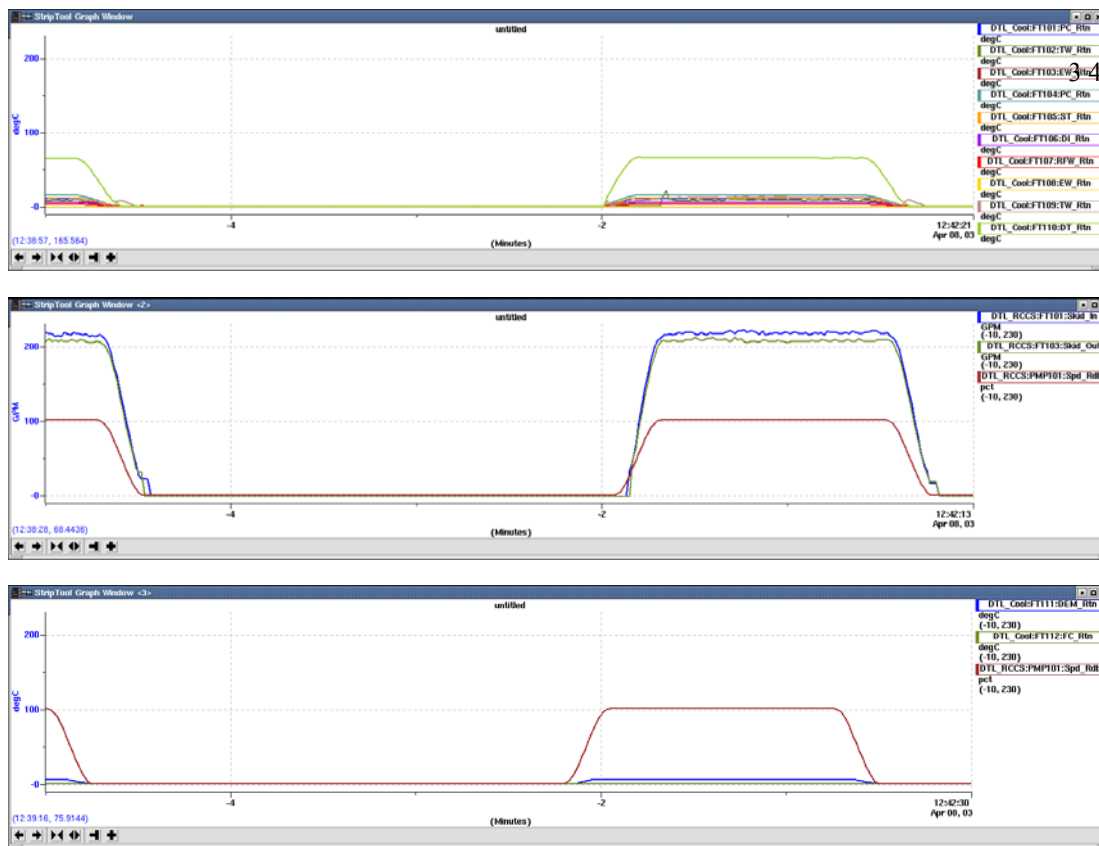
The work started to modify the Octupole corrector to be able to rotate to skew octupole when and if the stop band correction becomes necessary.

The injection septum has been powered and checked for measurement.

### **Controls**

Effort continued this week at both LANL and ORNL on preparations for the running of DTL3, 1 and the D-Plate. At LANL tuner racks 3 and 4 were delivered and the HPRF IOCs and PLCs for DTL1, 2 and 3 are up and running at. The DTL thermocouples have been added to the RCCS database and IOC at LANL, and the Beckhoff driver has been integrated into the RCCS system. At ORNL the Beckhoff hardware for these drift tube thermocouples was received, mounted in a newly-constructed EMI enclosure, tested in the lab with LANL software, moved to the site, and the cable connections to the thermocouples begun.

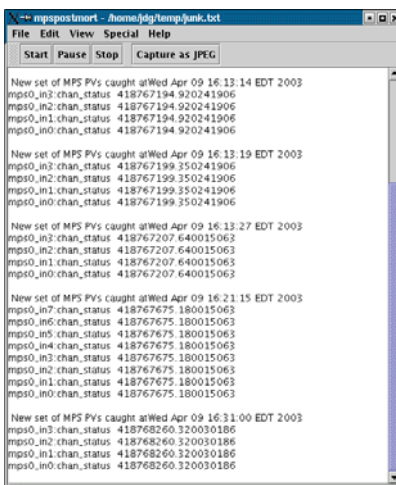
Also in preparation for DTL running, the controls team participated in the testing of the water systems. The charts below show some archived data taken during water system testing.



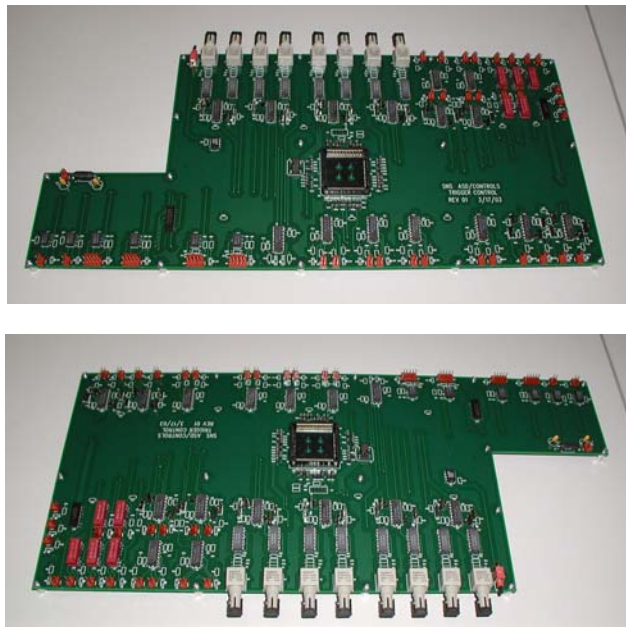
A new series of EMI noise measurements started this week. These will be compared the RFQ results. Early next week, both Klystrons should be powered and we should have good measurements on the improvements the RF group has made.

The materials for the EDM class that was given last week were packaged into a module and made available for use by our partner labs. Operator training on the timing system was given this week

All MPS Chassis and carriers are installed for D-Plate commissioning. Inputs will be connected as the hardware and cables are installed. MPS ARR documents are being filed in the controls workspace. An MPS post mortem correlator tool has been written by the Applications Group. A list of PVs is provided with a time between correlated data and a desired update. When one or more MPS devices trips, the tool sorts them by time and writes them to a scrollable window. One can then go back and see previous trips, etc. A sample output is shown below. The data can also be written to disk for statistics gathering. Future improvements will allow certain waveforms to be grabbed and displayed. Beam loss could then be correlated with LLRF amplitude and phase for instance.



The new trigger generator board is back from the vendor, is stuffed and ready for test. Fiber outputs and diagnostic LEDs were additions from the prototype. A larger CPLD was added in order to add a timing systems interface and for future upgrades. The board can be seen below.



After many weeks of work, the Controls Estimate-to-Completion was implemented in the MPM system. An updated level 5 milestone list, consistent with the ETC and schedule realities, was drafted for discussion with level 3 team leaders. The competition for three new technicians was closed, and a first review of resumes completed. The final list of candidates for interview will be determined next week. A new contract was placed for cabling database work to help with ring controls. A series of Functional System Description Documents were started as part of an effort to prepare for the upcoming Accelerator Readiness Review. An inventory of our VME crates was completed. VXI crates will be inventoried beginning next week.

Based on experience gained during the MEBT run, the BCM Labview program was revised at BNL for better performance. Certain operations are now performed in parallel, resulting in an improvement from 5Hz to 9Hz operation. Miscellaneous enhancements for robustness were added as well. The software has been made available to the ORNL Diagnostics Group. Timing system receiver boards are being updated with new firmware and will be cycled into production as required.

The PLCs provided by the vendor for the warm compressor skid have been loaded, configured, and are operating. The vendor is to provide updated software prior to operation. The SNS gas management PLC has been installed and configured. The Allen-Bradley ControlNet communication among these 7 PLCs is functioning over temporary cables. All local PanelView terminals are displaying real (but not yet calibrated) data. The IOC for the Gas Management and warm compressor systems was temporarily installed in the CHL control room. A building Ethernet cable was connected to the gas management PLC and patched to the control system network. EPICS OPI screens in the CHL control room and at 701 Scarboro displayed live data from the CHL warm compressors. Testing of the communication and signals for the EPICS IOC and PLC for the first 4 medium beta cryomodules was started.

## Installation

Craft Snapshot 4/9/03

ASD craft workers	73.0
Foremen, ES&H, etc	10.0
Less WBS 1.9 controls	6.0
Less absent	3.0
TOTAL	74.0



DTL #3 tuning was completed.

A leak was found in the stem of DTL #3 drift tube #23. A differential pumping subsystems will be set up on this drift tube to allow pump down of DTL #3 tank to lower pressure so conditioning can begin.

RCCS functional check out on DTL #3 continued.

DTL #3 klystron testing started on 11APR03.

Replacement transformers for HVCM-ME1 were received from Dynapower and installed.

First seven DTL #1 drift tubes were received from LANL.

DTL #1 LLRF system will be received from LBL next week.

The personnel exclusion fence east of the DTL #3/D-Plate/DTL #1 test area was completed. It is ready for PPS installation and certification.

Ring Crane training is scheduled for 17APR03.

Installation of cable tray in the HEBT Service Building continued.

Access to the HEBT Tunnel will occur on Tuesday 15APR03. A Ring Half Cell, number six (6) from BNL, will be unloaded into the HRBT Tunnel for storage on 17APR03. This is the first unit to go into the tunnel. The other five (5) units are stored in RATS I.

### **Accelerator Physics**

D. Jeon has explored the emittance growth that can be expected due to beam intensity variation within the pulse. He finds that for beam current in a +/- 20% band about the nominal 38 mA current, the emittance increase is less than +/- 5%.

### **Operations Group**

#### **ARR Preparation**

- Writing the Accelerator Safety Envelope (ASE) for DTL Tank1 Commissioning.
- Reminder that Pre-Commissioning System Checklists for DTL Tank 1 are due to Eugene. Will look at them and be sure they are do-able. Expect that System Engineers and the Group Leaders before the ARR will sign off the checklists.
- Completing Emergency Procedure update
- Migration of the Operations Procedures Manual to ProjectWise

We are working on integrating the Group-Sub-Group, Sub-Sub-Group structures across the Division software systems including ETS, E-Log, Call-Down, DataStream, and Beam Accounting.

#### **ASD Maintenance Plan**

- Building the Equipment and Personnel Organizational hierarchy tables.
- Building in the Group, Sub-Group, Sub Sub-Groups common to other systems
- Defining the Work Order and PM Structures.
- Operations and Project Office MIS personnel worked on data conversion with the MIS Group- Equipment and personnel data tables
- Presented the SNS approach at the ORNL Facilities Management Systems Study Meeting. Our approach was very well received.

Revising training modules and training operators for DTL Tank 1 Commissioning

Scheduled a meeting next week to discuss beam shutoff mechanisms next week with Diagnostics and Controls

Three Operations Personnel participated in the 2-day EDM Training so that operators can create EPICS screens

We worked with BNL on updating the ASD Spares list.

We continue to do CLO laboratory space planning for ASD including new costs related to Diagnostics Laser Lab.

We worked with CF on radiation Shielding implications of a new design for the air handling unit exhaust for the Ring.

### **Ion Source Group**

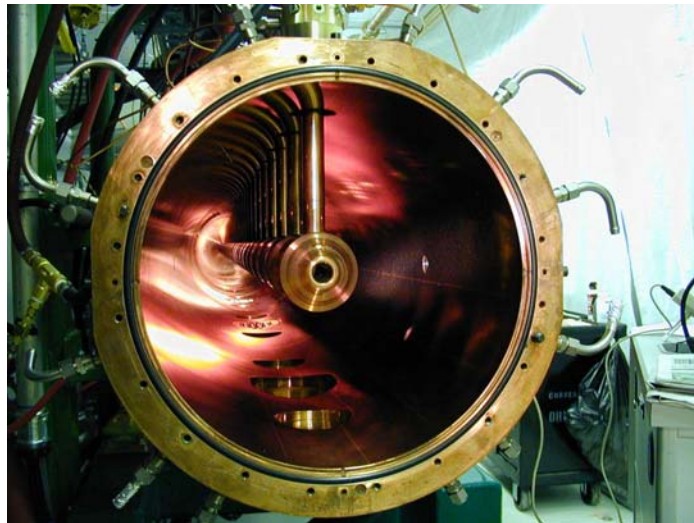
The first set of LEBT modifications has been completed. The main feature is the extractor being mounted using standard ceramic standoff with 6-32 sockets at both ends. The slightly larger insulator O.D. required the larger flowerpots to be drilled out, whereas the smaller flowerpots had to be re-fabricated with a slightly larger O.D. at the bottom. The elimination of the glue increases the temperature limit of the extractor, and thus increases the robustness of the LEBT.

Brackets have been designed to position the LEBT as well as to lock it in place. They incorporate clamps to hold digital indicators.

### **Survey and Alignment Group**

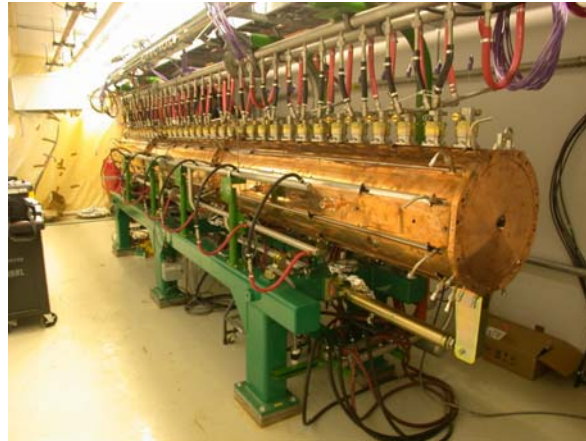
#### **Mechanical Group**

The last four DT's for DTL-3 have been fiducialized, installed, and aligned. This activity was completed late Friday evening (4-4-03), when there was less activity in the tunnel.



DTL-3 with 33 aligned DT's

Post couplers and slug tuners have been installed and tuning confirmed. The post coupler mounting bolts were modified to allow the couplers to be rotated  $\sim 1.5$  degrees. This improved the field tilt from about 4% to 1.5%.



DTL-3 with slug tuners and post couplers in place



DTL-3 Tuning Team

The DTL-3 iris has been installed and final iris tuning adjustments completed.



DTL-3 Iris Installation



A large leak has been found in DT-23 that is a dipole magnet DT. The leak is not from a water channel but is from the interior of the DT that is vented to the outside of the tank. Differentially pumping this area will be attempted this weekend.

Continued HEBT SB cable tray installation.

Received second shipment of Ring SB cable tray.

Staged transformers and AC panels for installation in HEBT SB.

Flushed and pressure tested the 402.5 glycol lines for the circulator loads on RFQ, DTL1, DTL2, DTL3, DTL4, DTL5, DTL6 in the Klystron Gallery.

Charged the RFQ and DTL glycol systems with propylene glycol.

Installed compressed air line drops for DTL1 and DTL2 in the Linac Tunnel.

Leak checked the RCCS 1 system for DTL1 and fixed several small leaks.

Installed monitoring equipment for RCCS 1 and RCCS 2 skids in the Klystron Gallery.

Balanced flows on RCCS 1 for DTL 1 in the Linac Tunnel.

### **Magnet Task**

Now we have measured and fiducialized 31 out of 33 12Q45's. We are making preparations to install Vacuum chambers into 12Q45's.

We have been moving 8D533's around for Error's group to check Vacuum chamber positions.

The 5th Ring Half Assembly is on the floor at RATS.

Last week I went to BNL with Mike Hechler for meetings concerning BNL equipment.

### **HPRF**

Linac HPRF: The DTL3 klystron was run up to full voltage with no RF output at a 10 Hz rate with 1.3 ms pulse width. Pedro Gonzalez of the ORNL Radiological Support Services performed X-ray measurements with no significant emissions detected. The klystron was then run, under EPICS control at 10 Hz with 1.0 ms pulse width, up to full rf power into a waveguide short in power increments while Matt Harrison of the ORNL Health & Safety Services swept the klystron and waveguide flanges at each new power level. No RF emissions were detected. The DTL3 klystron is now ready for high power service.

A quarter inch thick adapter plate was designed and fabricated to allow the 805 MHz, 550 kW CPI klystrons and magnets to be lifted from their HV tanks as a unit. Previously, the klystron would have had to be lifted out of the cylindrical magnet, which required disconnecting three klystrons and air padding the HV-tank to an outside door where a mobile crane could lift it. With this \$97.00 adapter plate, a forklift can remove and replace klystron-magnet assembly's insitu.

### **LLRF**

ORNL

DTL Installation & Support

We supported high power RF testing of the DTL3 klystron. The RF Controller for DTL1 is expected to ship from LBNL by April 18. Mark Crofford will visit LBNL next week to assist in the testing of the DTL1 controller and the repair of the spare MEBT controller.

#### Reference System

Installation of the reference system continued with emphasis on completing the cabling needed for DTL1&3.

#### Performance Measurements

We continued our performance measurements using the low power setup on the RFQ with emphasis on developing autostart procedures. Hengjie and Larry have arrived at similar conclusions working in parallel to determine the setting for the gain rotation matrix.

#### Miscellaneous

A team videoconference was held on Wednesday. The JLab test results were presented. The data set has been placed on the SNS ftp server for easy access. Sung-il as sent out an analysis of the open-loop data. The dynamic Lorentz force detuning is ~300 Hz at 15.7 MV/m (60 Hz, 1.2 ms).

Matt and John arrived in Oak Ridge at the end of the week and brought with them a prototype Digital Front End (DFE) with a PCI carrier board. They will work with Craig Swanson next week to further check out the DFE.

#### LANL

#### LBNL

We completed the fabrication of the chassis for the DTL1. Its testing has started and all power supplies and analog circuits have checked ok. We plan to complete the testing next week and to ship before the end of the week as planned.

Larry completed the first cut at the algorithm needed to automatically determine the loop phase setting for an autostart function. The algorithm is, at the moment, very simple, and only works when the cavity is within a few degrees of resonance. The loop measures the phase of the open loop response of the system, from feedforward table to cavity field. It then sets the Gain rot process variable to that phase minus 160 degrees. This has been successfully tested in the cavity test setup in Berkeley, using a trombone to include large phase shifts that made the loop unstable. This can now be integrated with the existing algorithm that automatically detects the cavity tuning condition as a more complete autostart function. The routine has been circulated among the collaboration to share the experience in more installations.

A firmware implementation that allows for running the DDS off frequency in open loop conditions is being studied.

The procurement of critical components has been placed. The new nanoEngines already arrived, including one that was repaired under warranty. The bad unit repaired under warranty was taken from the MEBT rack that will be examined next week and was having trouble. It is very likely that this defective unit generated some problems. The order for the RLC filters has also been placed. Delivery is expected by mid-June.

The hardware glitch is still under investigation and has resumed with the arrival of the new nanoEngines.

We took a full set of open and closed loop data on the cavity test stand and are using the existing models to compare with the measurement results.

#### Electrical Systems Group

The overheating problem for the front-end power supplies has been solved. This involved changing transformers inside the largest power supplies (done at no charge by the power supply manufacturer), installing an additional equipment rack so as to have only 4 power supplies per rack rather than 6, and adding additional cooling fans. The power supplies were tested for 8 hours at full power (~20 % above nominal operating points) with surrounding racks powered. Internal rack temperatures only rose 4 degrees F during this time, as opposed to over the 50 degrees F seen before these changes were made.

Installation of DTL1 and DTL2 corrector power supplies has started with power supplies mounted and connected to ac and dc cabling. Controls fiber is being installed in preparation for testing. DTL 2 power supplies will be used for D-plate operation.

The majority of HEBT and RING system DC cable and HEBT system cable tray received on site.

HEBT SB AC distribution panels and transformers have been received.

HEBT SB tray installation in progress, all hangers installed.

DTL3- eleven out of 33 thermocouples were terminated.

DTL2 (D-plate) DC wires were prepared for testing without magnets.

Operation of ME2 into DTL3 klystron occurred this week. See the RF Group report for specifics. ME1 (RFQ/DTL1/DTL2) transformers arrived Monday and the complete unit will be installed by COB Friday. We plan to bring the modulator on-line into the DTL1 klystron on Monday of next week. RFTF modulator has been delayed slightly to focus on ME1, but it should be ready for checkout next week. We will be adding additional diagnostics on the RFTF unit to support operational and reliability studies, since HPRF component testing has been descope for this unit.

### **Cryogenics Group**

CHL: Leak testing of the installed sections of the LN2 system continues. Work continues on the instrument air system. Weather has prevented the installation of the top filter system of the charcoal bed absorber. Final bids are due back this week for the purifier piping installation package. Warm helium compressor status is now readable on the CHL control room monitors.

Tunnel: The 10" pipe of the upstream return module has been cold shocked and leak tested. Wrapping the 10" line with superinsulation is now under way. Installation of the upstream warm gas piping is continuing. A second installation team has now started work installing transfer lines.

RATS: Welding of the outer vacuum jacket of the return expansion can is completed. This completes all of the fabrication of the transfer line and associated components in the RATS building. Some of the technical staff has been reassigned to the installation of the transfer lines in the tunnel. We have started assembling the Nibco valves with the proper seals.

### **Beam Diagnostics**

BNL Beam Diagnostics Progress report:

1.5.7.4 BCM: A calibrator has been received and tested. Revisions have been made, drawings modified, and the remaining 3 units continue to be constructed. Work continues on the high current calibrator design. The PC chassis modifications are underway. Additional PC's have been ordered. PC software has been upgraded and is under test. We continued working on support design. Finished machining the production parts. Finished welding two sets of vacuum breaks onto vacuum chambers. Continued welding of three other sets. Fabricated a fixture to line up housings for the welding.

1.5.7.5 Tune: Rack space requirements for incoherent tune power amplifiers were forwarded to ORNL. These amplifiers will be specified to permit use for determination of power requirements for the damper amplifiers.

1.5.7.6 Carbon Wire Scanner: Finished welding 8 WS beam box assemblies. Continued welding of four more beam box assemblies. Baking three WS beam box assemblies. Continued working on support design

1.5.7.7 BIG: Polarity has submitted a revised quote for \$610K that includes pulse polarity switching. Work on formal specification continues. Checked with Andrews about cable voltage ratings. Andrews does not test their cables in pulse mode. They recommend using a 1-1/4" Heliac rated at 9KV. Located two connectors for use at these power levels. A list of items for rack requirements is underway.

1.5.7.8 VFM: The development PC has been setup with the network, and PCI cards installed.

#### LANL beam diagnostics progress report

BPM pickups: Extension tubes are now on 3 more DTL BPM bodies. They are ready for final RF checks. This will make a total of 8 DTL BPMs ready to install into drift tubes. Three more DTL BPMs are in various stages of fabrication. The last two SCL BPMs will be mapped and shipped after the mapper is repaired (hard drive crash).

BPM electronics: Two members of the diagnostics team traveled to ORNL this week to install 3 ea. BPM chassis for the D-plate. They will remain there through the end of next week. Nine more PCI/DFE/AFE units are being fabricated.

WS actuators: Work continues at Huntington on our production order of the DTL and CCL actuators, and on the prototype units for the HEBT, ring, and RTBT. The forks for the DTL and CCL units were received this week, complete with the collets. We are working to firm up beam tunnel space requirements for the HEBT/ring/RTBT actuators. Sketches were sent to ORNL for more detailed layouts and approval of beam line space restrictions. The 18-inch actuator planned for the RTBT is too big, and we are working to reduce the stroke requirement to 12 inches by giving up on the idea that no more than one wire at a time should be within +/- 2 rms of the beam center.

WS electronics: Work continues to fabricate 27 each more signal processor chassis to complete all units needed for the DTL, CCL, and HEBT. The PC boards have arrived, and we are in the process of assembling parts kits for the vendor who will stuff the boards. We've also order 13 ea. PCs (enough for DTL, CCL, and 2 spares) that will be shipped directly to ORNL. All the NI DAQ and motor controller PCI cards are on order.

ED/FC: The leak in the DTL-1 unit mentioned in the 28/Mar report has been traced to a loose vacuum seal near the base of the unit. The unit was repaired and shipped back to ORNL. We are working to prepare the bid package to fabricate the remaining 5 actuators. Work has begun to fabricate the remaining two electronics chassis.

D-plate: We've ordered 5 more reinforcing sleeves for the DTL-1 and D-plate actuators. The view screen is at a local vendor shop to have four fiducial holes drilled. We received the adapter flange to match the fast valve sensor to the flange on the D-plate. The adapter spool piece vacuum feedthrough for the BCM is expected to arrive this week or next week.

#### ORNL Beam Diagnostics Progress report:

D-Plate: Using the automated cable test system, TDR on the D-Plate BPM cables was performed. Data is in the database, referenced by the bar-coded cable number. We have ensured that the cables needed for D-Plate are pulled to the correct location. D-plate cable pulling will be finished this Monday after the signal cables for the BLMs are pulled. All BLM information has been updated in the database. Everything from equipment names to rack profiles agrees with the latest BNL design information. The BPM rack has been prepped and is ready for electronics installation and testing. These BPM activities are being performed with visiting engineers from LANL. Initial tests performed in the lab on Friday show that the system is capable of providing phase measurements.

MEBT D-Box: The strength of the stepper motor with two different motor drivers was measured using load cell. The results are:

- With National Instruments driver, motor supported 85 +/- 10 lbs.
- With Applied Motion, motor supported 60 +/- 15 lbs.

General Purpose Digitizer System: To support the Ion Source group, we have begun setup of a general-purpose digitizer system. This is based on the hardware from the laser test and consists of LabVIEW, an Acqiris DP240 Digitizer, and a rack mount PC.

Software: Created the physics test NAD with test client. This NAD now uses labview run-time and can be built and distributed using the labview builder application. It generates 3 traces of 100 samples at 10 Hz for testing the Java scope app and creates higher speed bursts of updates (adjustable) to test Java client performance. The server and client screens are shown below:

